

AMENDMENTS TO THE CLAIMS

The following is a complete, marked-up listing of revised claims with a status identifier in parenthesis, underlined text indicating insertions, and strike through and/or double-bracketed text indicating deletions.

LISTING OF CLAIMS

1. (Currently Amended) A semiconductor device test apparatus comprising:

~~a main body including a loading robot and a sorting robot disposed thereon, and an unloading robot disposed thereon to move along an X-axis and a Y-axis~~

a main body including a sorting robot disposed thereon to move along an X-axis, and a loading robot and an unloading robot disposed thereon to each move along both an X-axis and a Y-axis;

a soak chamber;

a test chamber; and

a desoak chamber,

wherein the soak chamber, the test chamber, and the desoak chamber are attached to the main body and separable from the main body.

2. (Previously Presented) The semiconductor device test apparatus of claim 1 wherein the soak chamber, the test chamber, and the desoak chamber are separable from the main body using a sliding unit.

3. (Currently Amended) A semiconductor device test apparatus comprising:

~~a main body including a loading robot and a sorting robot disposed thereon, and an unloading robot disposed thereon to move along an X-axis and a Y-axis~~

a main body including a sorting robot disposed thereon to move along an X-axis, and a loading robot and an unloading robot disposed thereon to each move along both an X-axis and a Y-axis; and

a stacker for stacking devices before and after a test, the stacker including user trays for stacking the devices, wherein the user trays are interchangeable such that the user trays may be used to stack the devices prior to the test and to stack the devices after the test.

4. (Previously Presented) The semiconductor device test apparatus of claim 3, wherein the user trays are interchangeable in accordance with the process of the test.

5. (Currently Amended) A semiconductor device test apparatus comprising:

~~a main body including a loading robot and a sorting robot disposed thereon, and an unloading robot disposed thereon to move along an X-axis and a Y-axis~~

a main body including a sorting robot disposed thereon to move along an X-axis, and a loading robot and an unloading robot disposed thereon to each move along both an X-axis and a Y-axis; and

a stacker for stacking devices before and after a test, the stacker including at least one user tray feeder predesignated with a function for stacking un-tested devices and at least one user tray sender predesignated with a function for stacking tested devices, wherein the user tray functions being interchangeable during stacker operation.

6. (Currently Amended) A semiconductor device test apparatus comprising:

~~a main body including a loading robot and a sorting robot disposed thereon, and an unloading robot disposed thereon to move along an X-axis and a Y-axis~~

a main body including a sorting robot disposed thereon to move along an X-axis, and a loading robot and an unloading robot disposed thereon to each move along both an X-axis and a Y-axis; and

a stacker arranged in the main body, the stacker having a user tray feeder which loads a plurality of user trays having a desired quantity of devices to be tested and a user tray sender which loads the plurality of user trays having the devices sorted by their grades in accordance with the test result, wherein the user tray feeder and the user tray sender are interchangeable in their uses in accordance with the process of the test.

7. (Previously Presented) The semiconductor device test apparatus of claim 6 further comprising:

a soak chamber for receiving the test tray inputted from the device loader, and for preheating or precooling the devices;

a test chamber for connecting the preheated devices in the soak chamber to a socket of a test head and for performing a test;

a desoak chamber for receiving the test tray discharged from the test chamber and for discharging them to a device unloader after recovering them to a room temperature;

wherein the soak chamber, the test chamber and the desoak chamber are separable from the main body using a sliding unit.

8. (Previously Presented) The apparatus according to claim 7, wherein the soak chamber and the test chamber are made of one body separable in the same direction.

9. (Previously Presented) The apparatus according to claim 7, wherein the desoak chamber is separable in same direction as the separation direction of the soak chamber and the test chamber.

10. (Original) The semiconductor device test apparatus of claim 6 further comprising:

a loading robot for picking up devices to be tested which are in a stand-by status in the user tray feeder and mounting them on a test tray being on a device loading stage;

a sorting robot for picking up the device discharged to the device unloader and for carrying them to a plurality of sorter tables in accordance with the test result; and

an unloading robot for picking up the device carried to the sorter table and for carrying them to the user tray sender.

11. (Withdrawn) A semiconductor device test apparatus comprising:

a test chamber for providing desired test space;

at least one test head installed on one side of the test chamber;

a socket assembly having a socket block and a plurality of socket guides, the socket block being arranged on the test head at a desired interval in a matrix form and having a plurality of sockets contacted with a plurality of devices, the socket guide covering an upper part of the socket block and having a plurality of socket guides provided with a plurality of windows to pass through a contact pin of the socket;

a test tray for loading a plurality of inserts and for arranging the inserts in a matrix form corresponding to the arrangement form of the socket, the inserts having a plurality of device receivers to receive devices corresponding to the plurality of sockets; and

a lead pusher assembly having a match plate, a plurality of pressure plates and a plurality of pushers, the match plate being arranged in parallel with the test head and being connected to a driving unit, the pressure plates being arranged in the match plate through a contact block in a matrix form corresponding to the insert arrangement form, the pushers being arranged in a side of the pressure plate and pressing a lead of the device.

12. (Withdrawn) The apparatus according to claim 11, wherein the socket assembly includes four sockets, the insert includes four insert receivers, and the pressure plate includes four pushers, the sockets, inserts and pushers being arranged in 2 rows and 2 columns.

13. (Withdrawn) The apparatus according to claim 12, wherein a protruded fixing piece having a through hole is formed on both ends of the pocket; the apparatus further including:

a fixing hole that communicates with the through hole of the fixing piece, the fixing hole being part of the insert; and

a pocket fastener having a cylindrical body, the cylindrical body having a forked part a stopper, the stopper being inserted into the through hole and the fixing hole, the stopper being formed under the body and being stopped under the bottom of the insert; and

a hook, the hook being inserted into the through hole and the fixing hole, the hook being formed on the body and being hooked on the upper surface of the pocket.

14. (Withdrawn) The apparatus according to claim 12, wherein a first guider is formed around four sides of an inner part of the pocket; and

a second guider to guide a loading operation of the devices, the second guider being formed in both ends of the insert receiver.

15. (Withdrawn) The apparatus according to claim 11, wherein the socket assembly, the insert, and the pressure plate are arranged on the test head, the test tray and the match plate in four rows and eight columns, respectively.

16. (Withdrawn) The apparatus according to claim 15, wherein the pocket fastener is formed to have an outer diameter of the body smaller than inner diameters of the through hole and the fixing hole so as to give flexibility to the pocket.

17. (Withdrawn) The apparatus according to claim 11, wherein the insert receiver has a pocket which receives the devices.

18. (Withdrawn) The apparatus according to claim 17, wherein the socket has a fixing protrusion on its lower part and a pocket position determination pin on its upper part, the protrusion being inserted into the socket block, the pocket position determination pin passing through the through holes formed around the window of the socket guide; and

a position determination groove arranged on the lower part of the pocket, into which the pocket position determination pin is inserted.

19. (Withdrawn) The apparatus according to claim 18, wherein the first resilient member is a coiled compression spring.

20. (Withdrawn) The apparatus according to claim 18, wherein a plurality of first and second position determination holes are formed in sides of the insert;

first pressure plate protusion pins and second pressure plate protrusion pins that are inserted into the first and the second position determination holes, first pressure plate protusion pins and second pressure plate protrusion pins formed in the four sides of the pressure plate; and

a socket guide protrusion pin which is inserted from the lower part of the first position determination hole, the socket guide protrusion pin is formed on the upper part of the socket guide.

21. (Withdrawn) The apparatus according to claim 11, further comprising a first resilient member arranged between the match plate and the pressure plate.

22. (Withdrawn) The apparatus according to claim 21, wherein a length of the second pressure plate protrusion pin inserted into the second position determination is long enough such that the second pressure plate protrusion pin contacts the upper surface of the socket guide; and

a length of the first pressure plate protrusion pin is long enough such that the the total length of the first pressure plate protrusion pin and the socket guide protrusion pin, together, that are inserted into the first position determination hole are the same length as the second pressure plate protrusion pin.

23. (Withdrawn) The apparatus according to claim 11, wherein a protruded reinforcement rib is formed in an upper edge of the socket guide.

24. (Withdrawn) The apparatus according to claim 11, wherein there are two test heads arranged vertically.

25. (Withdrawn) A semiconductor device test apparatus comprising:
a test chamber;
at least one test head installed in one side of the test chamber;
a plurality of sockets installed on the test head;
a test tray having an insert receiving a plurality of devices to be contacted with the socket;
a lead pusher assembly including,
a pusher for pressing a lead of the device, a pressure plate on the pusher,
a contact block installed on the pressure plate, and
a match plate in contact with the upper edge of the contact block and having a plurality of through holes to open the upper edge of the contact block, a conductor that penetrates an inner part of the pusher, the conductor making its bottom contacted with the upper surface of the device, the conductor having an upper part that passes through the pressure plate; and
a heat sink including a central and inner part that are connected to the upper part of the conductor, the heat sink radiates the heat conducted from the conductor.

26. (Withdrawn) The apparatus according to claim 25, wherein the conductor includes,

a device contact part of a first surface which is in contact with the device;

a protruded support axis on a second surface of the device contact part, the conductor passes through the upper part of the pressure plate; and

a resilient member mounted outside the support axis through which the pressure plate passes.

27. (Withdrawn) The apparatus according to claim 26, wherein the resilient member is a coiled compression spring.

28. (Withdrawn) The apparatus according to claim 25, wherein the heat sink is formed cylindrically and has a plurality of prominences and depressions on its outer surface to increase the heat dispersion area.

29. (Withdrawn) The apparatus according to claim 25, wherein the contact block has through holes on its upper surface and four side surfaces in order that air input through the through hole of the match plate is easily dispersed along the four side surfaces.

30. (Withdrawn) The apparatus according to claim 25, further including,
an air passage hole corresponding to an air passage hole of the match plate is at the rear of the match plate;

a driving plate provided with a driving axis is at the rear of the match plate;

a flexible duct opened at both ends is connected to the driving plate;

a rectangular box type fixing duct opened in its side which is connected to the flexible duct is at one end of the flexible duct; and

a temperature control ventilation apparatus inside a test chamber, the temperature control ventilation apparatus providing one side of the test chamber with temperature controlled air through the flexible duct, and making the temperature controlled air to be input through a space between the match plate and a test tray after the temperature controlled air has contacted the heat sink.

31. (Withdrawn) A semiconductor device test apparatus comprising:

a perforated heat sink including a conductor extended from the perforated heat sink, the conductor in direct contact with a device during a testing cycle to dissipate heat from the device during the testing cycle.

32. (Withdrawn) The semiconductor device test apparatus of claim 31 further comprising:

a temperature control ventilation apparatus that causes air to flow through the perforated heat sink, contact the heat sink, contact the conductor, and contact the device to help control the temperature of the device during the testing cycle.

33. (Currently Amended) A semiconductor device test apparatus comprising:

a loading robot ~~for picking up devices~~ to move along an X-axis and a Y-axis for picking up devices to be tested which are in a stand-by status in a user tray feeder and mounting the devices on a test tray, the test tray being on a device loading stage;

a sorting robot ~~for picking up the device~~ to move along an X-axis and for picking up the device discharged to the device unloader and for carrying the device discharged to a plurality of sorter tables in accordance with the test result; and

an unloading robot to move along an X-axis and a Y-axis and for picking up the device carried to the sorter table and for carrying the device to the user tray sender;

wherein the operating speeds of the loading robot, the sorting robot, and the unloading robot is determined based on the speed of testing the device.

34. (Currently Amended) A semiconductor device test apparatus comprising:
~~at least one~~ a robot including a sorting robot disposed to move along an X-axis, and a loading robot and an unloading robot disposed to each move along both an X-axis and a Y-axis used in a test that receives control signals instructing the ~~at least one~~ robot to carry a device at a calculated speed, the calculated speed corresponding based on a time of test execution.

35. (Canceled)

36. (Canceled)

37. (Previously Presented) A method for stacking devices in a semiconductor test apparatus comprising;

predesignating at least one user tray feeder for stacking un-tested devices;

predesignating at least one user tray sender for stacking tested devices;

designating at least one user tray feeder for stacking tested devices based on the test; and

stacking at least one tested device on the at least one user tray feeder.

38. (Withdrawn) A method for testing a device using a semiconductor device test apparatus comprising:

providing a test chamber with a desired test space;

installing at least one test head on one side of the test chamber;

arranging a socket block and a plurality of socket guides to form a socket assembly, the socket block being positioned on the test head at a desired interval in a matrix form and having a plurality of sockets contacted with a plurality of devices, the socket guide covering an upper part of the socket block and having a plurality of socket guides provided with a plurality of windows to pass through a contact pin of the socket;

loading a plurality of inserts using a test tray;

arranging the inserts in a matrix to correspond to the arrangement of the socket, the inserts having a plurality of device receivers to receive devices corresponding to the plurality of sockets; and

assembling a lead pusher assembly to include a match plate, a plurality of pressure plates and a plurality of pushers, the match plate being arranged in parallel with the test head and being connected to a driving unit, the pressure plates being arranged in the match plate through a contact block in a matrix corresponding to the insert arrangement, the pushers being arranged in a side of the pressure plate and pressing a lead of the device.

39. (Withdrawn) A method for testing a semiconductor device including:

contacting a conductor that extends away from a perforated heat sink with the device during the testing cycle to dissipate heat from the device; and

flowing air through the perforations of the heat sink to make contact with the heat sink, the conductor, and the device to help control the temperature of the device during the testing cycle.

40. (Previously Presented) A method for controlling a robot speed of a semiconductor device test apparatus, comprising the steps of:

sending control signals to at least one robot to carry a device for a test detecting a time for the test;

calculating a desired speed value of the robot corresponding to the test time detected; and

informing the corresponding robot of the calculated speed value to control the speed of the robot.

41. (Original) The method according to claim 40, wherein the time for the test begins when the device contacts a test head and ends when the device is released from the socket.

42. (Currently Amended) The method according to claim 40, wherein the step of detecting the time for the test includes ~~retrieving~~ retrieving stored values of pretested, like kind devices.

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